

Radius Thunder

User's Manual

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Introduction

Thank you for purchasing a Radius Thunder- interface card for your Macintosh or Power Macintosh. Thunder interface cards provide exceptional 24-bit performance and full Macintosh compatibility for your color imaging, illustration, 3D-rendering and graphic-design needs.

Your Thunder interface features:

√ Acceleration for QuickDraw™ imaging

Thunder interface cards accelerate screen redraw processes used by all Macintosh applications. With Thunder, your Macintosh will be faster and more responsive, no matter what application you are using.

√ PhotoEngine™ acceleration for Adobe Photoshop™

Four digital-signal processors (DSPs) on Thunder IV interface cards accelerate the most widely-used and calculation-intensive image-processing operations of Adobe Photoshop.

If you have a Thunder/24 GT interface, you can add PhotoEngine acceleration by purchasing a Thunder/24 CIT Upgrade from your Radius Reseller.

√ CMYK acceleration

Thunder IV interface cards (and Thunder/24 cards equipped with a Thunder/24 CIT Upgrade) accelerate CMYK mode changes and redraw calculations within Adobe Photoshop. Conversion of images from RGB or LAB to CMYK mode is much faster. And when you work within CMYK mode, you no longer have to stop and wait for your screen to finish redrawing each time you make a change to your image. Editing images in CMYK mode is almost as effortless as editing in RGB mode.

√ Support for the widest range of color displays

Thunder interface cards are compatible with most brands of 1" to 21" displays, including those from Radius, SuperMac, Apple, Sony, NEC, RasterOps and other manufacturers.

√ Flash-ROMs for easy upgrades

The special "Flash" ROM on your interface card can be updated through a simple software program. Updates will be available through bulletin board services, avoiding delays and costly dealer upgrades. And a ROM upgrade can be done "in place" without opening your computer and removing the interface card.

√ A lifetime of worry-free operation

Your new Radius Thunder interface card is protected with the Radius LifeTime replacement warranty.

About PhotoEngine Acceleration

The PhotoEngine hardware built into Thunder IV interface cards is an AdobeCharged™ accelerator that uses four AT&T digital signal processors (DSPs) to speed up the processing of critical Adobe Photoshop operations such as filters, image resizing and rotation, and color separations and conversions. It also accelerates the on-screen display of CMYK images. PhotoEngine can compute some of Adobe Photoshop's time-consuming, image-manipulation and processing functions much faster than your Macintosh or Power Macintosh can do alone.

PhotoEngine provides:

√ Transparent use with Adobe Photoshop. Menu and filter commands are the same as when using Adobe Photoshop without PhotoEngine.

√ A Photoshop plug-in that directs processing to the DSPs automatically, each time you use Adobe Photoshop

√ Accelerated conversion to CYMK format

√ Accelerated screen redraw when working in CMYK mode

The Adobe Charged certification indicates that PhotoEngine has been certified by Adobe Systems, Inc. to achieve visually identical results of the same high quality as those achieved without acceleration. The only difference is the increased speed of operation. For complete information about PhotoEngine, see Chapter 3 of this manual.

About RadiusWare

RadiusWare software, included in your Thunder interface kit, provides a variety of software features for the display connected to your Macintosh system. The RadiusWare files, Dynamic Desktop® and QuickColor™, must be installed into the System Folder of your startup disk to take advantage of their special features. An automatic Installer is included on the RadiusWare disk.

RadiusWare files are provided on high-density (1.44MB) floppy disks. If your computer has an 800k floppy disk drive, it will be unable to read these disks. However, RadiusWare files are available 24 hours a day from the Radius Bulletin Board Service at (408)541-6190. Support through other on-line services, such as CompuServe, Internet, and America Online, also is available. See the Warranty and Software License Agreement card included with your interface for more information.) You also can contact your Radius Reseller for assistance in copying the software to 800k-capacity disks.

The *RadiusWare User's Manual*, included with your Thunder interface kit, describes how to install and use the RadiusWare software.

Becoming a Registered User

You will find a Warranty Registration card in your Thunder interface kit. Please fill out the card and return it to us so we can register your LifeTime warranty and provide you with the best customer support possible.

About This Manual

This manual describes how to install your Radius Thunder interface card and explains its features.

- Chapter 1.....*Installing the Thunder interface Card* explains how to install the Thunder interface card into your Macintosh computer.
- Chapter 2.....*Getting Started* explains how to set up your display and install RadiusWare and PhotoEngine software. This chapter also describes some of the features of the RadiusWare Dynamic Desktop and how to use them.
- Chapter 3.....*Using PhotoEngine Acceleration* describes how to install and use PhotoEngine software with Thunder IV cards (and Thunder/24 CIT cards equipped with a Thunder/24 CIT Upgrade).
- Chapter 4.....*Troubleshooting* contains a information for troubleshooting and correcting simple problems that can occur after installation.
- Appendixes.....Give technical specifications, a list of compatible displays and display resolutions, and regulatory information.

Chapter 1 - Installing the Thunder Interface Card

This chapter explains how to install your Radius Thunder interface card into a Macintosh computer equipped with a NuBus expansion slot. As of the publication date of this manual Radius Thunder interface cards can be installed in the following models:

- Macintosh II
- Macintosh Iix
- Macintosh Ilcx
- Macintosh Ilci
- Macintosh Ilfx
- Macintosh Jlvx
- Macintosh Ilvi
- Macintosh Ilsi
- Performa™ 600
- Centris™ 610
- Centris 650
- Centris 660AV
- Quadra™ 610
- Quadra 650
- Quadra 660AV
- Quadra 700
- Quadra 800
- Quadra 840AV
- Quadra 900
- Quadra 950
- Power Macintosh 6100
- Power Macintosh 7100
- Power Macintosh 8100

You will need an Apple NuBus adapter card to install the Thunder interface card into one of the following computers:

- √ Macintosh Ilsi
- √ Centris610
- √ Quadra 610
- √ Quadra 660AV
- √ Power Macintosh 6100

The Apple Macintosh Ilsi NuBus adapter card (Apple part number M048ILL/A) allow you to install one NuBus expansion card (such as your Thunder interface card), and includes a 68882 floating-point math coprocessor. The Centris 610 NuBus adapter card (Apple part number MI402LL/A) allows you to install one NuBus card of up to 7" in length. See your Radius Reseller to purchase one of these adapter cards.

WARNING: Do not remove your interface card from the antistatic bag until you are familiar with the following precautions. Improper handling or installation can damage the interface card and computer.

- Except when installing a card in a Quadra 900 or Quadra 950, always leave the computer plugged in and with the power turned off This properly grounds the system during the installation process.

- Unplug a Quadra 900 or Quadra 950 before installation to avoid electric shock.
- Handle the card only by its edges. Avoid touching the connectors and integrated circuits.
- Each expansion card uses power from the computer's power supply. All your installed expansion cards must not exceed the maximum power consumption of your computer. See page 40 for power consumption values for your Thunder interface card. Refer to the Macintosh Getting Started manual for the maximum power usage allowed by your computer

Installation for the Power Macintosh Family

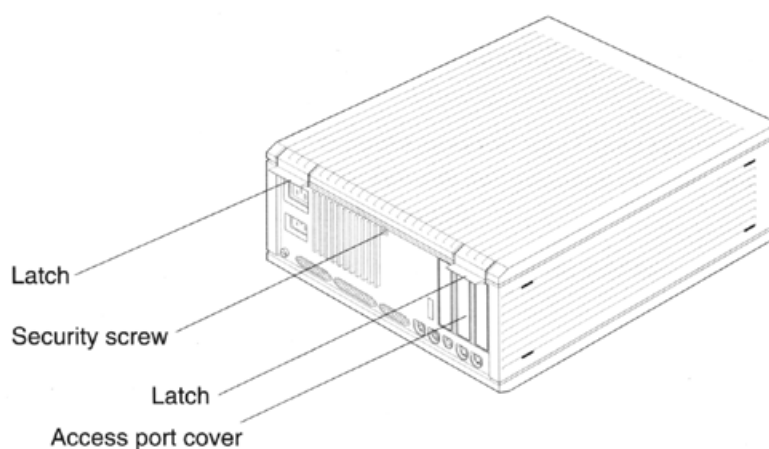
Installation for the Macintosh II Family

Use the following procedure to install a Radius Thunder interface card in a Macintosh II, IIX, IICX, IICI, IIFX or IISI.

Note: You must purchase a Macintosh IIsi NuBus adapter from your authorized Apple reseller before you can install a Radius Thunder interface card in a Macintosh IIsi.

Opening the Computer

The following figure shows the back panel of a three-slot Macintosh. Refer to this figure when you open your Macintosh. Although your Macintosh may look slightly different from the model shown, the steps for opening the case and installing the interface card are similar for the entire Macintosh II family of computers.



To open the Macintosh case:

1. Remove any disk in the floppy disk drive.
2. Shut down the Macintosh.
3. Turn off the power on all hardware components connected to the Macintosh, including the display and external hard disk drive.

Leave the power cord of the Macintosh plugged into the power source; the power cord grounds the Macintosh and protects it from electrical damage. If the Macintosh is plugged into a power strip, leave the power strip plugged

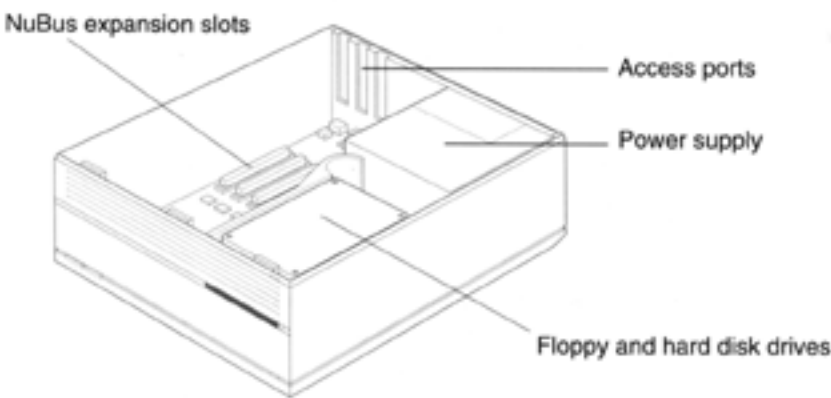
into the power source and turned on during installation.

- 4. Use a screwdriver to remove the security screw.
- 5. Gently lift the two latches on the back of the Macintosh case to release the cover. If you have a Macintosh II, IIx, or IIfx, push in the tabs on the back of the case to release the cover.
- 6. Lift the cover up and away from the computer.

Installing the Interface Card

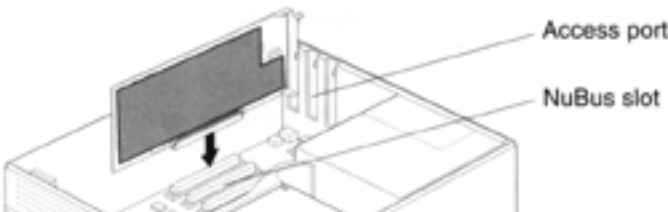
To install the interface card in your Macintosh:

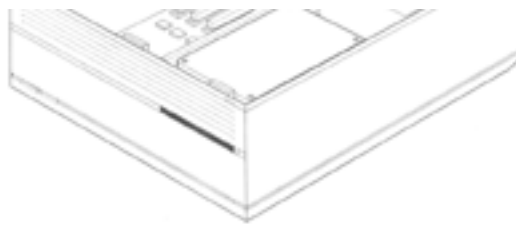
- 1. Locate an unoccupied NuBus expansion slot in the Macintosh (see the following figure). Remove the plastic access port cover and, if necessary, the corresponding metal access port shield. Keep the cover and shield in case you need to remove and store the interface card later.



- 2. Touch the computer's power supply to discharge any accumulated static electricity. Even small amounts of static electricity can damage the interface card or your Macintosh.
- 3. Remove the interface card from the antistatic bag. Orient the card with the NuBus connector facing down and with the video port pointing toward the access port on the back of the Macintosh.
- 4. Tilting the card slightly, guide the video port of the interface card into the access port of the Macintosh.
- 5. Align the NuBus connector of the interface card with the NuBus expansion slot.

Some Macintosh models have a guide pin at the top of the expansion port opening and a clip near the bottom of the opening. If your Macintosh has a guide pin, align the hole in the top of the interface card mounting bracket with the pin. If your Macintosh does not have a guide pin, you can still install the card successfully without it. Align the slot at the bottom of the interface card mounting bracket with the clip.





6. With the card perpendicular to the expansion slot, gently press down on the top edge of the interface card until the NuBus connector firmly seats in the expansion slot.

Do not force the interface card into place. If the card does not seat properly in the connector, gently lift the card, check for bent pins, and try again.

The video port of the interface card should be visible through the access port at the back of the Macintosh.

Closing the Macintosh

- 1.** Align the front of the cover with the front of the case.
- 2.** Lower the back edge of the cover until the latches snap into place.
- 3.** Replace the security screw.

You have now finished installing the Radius Thunder interface card in the Macintosh. Go to Chapter 2,"Getting Started."

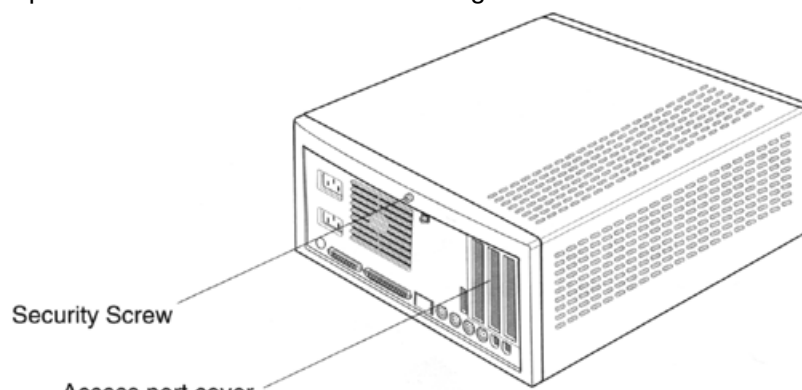
Installation for the Power Macintosh 7100, Quadra 650, Centris 650, Performa 600, and Macintosh IIvi/vx

Follow these steps to open the case and install the interface card,

Opening the Computer To open the computer case:

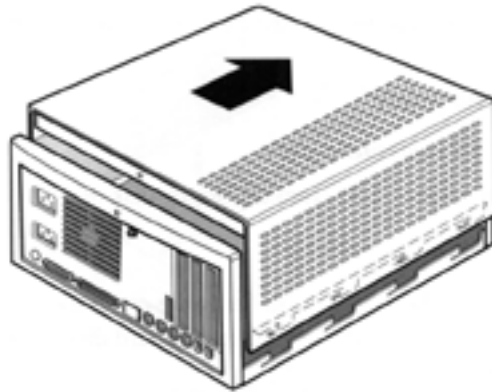
- 1.** Remove any disks from the floppy disk drive or the CD-ROM drive.
- 2.** Shut down the computer.
- 3.** Turn off the power on all hardware components connected to the computer, including the display and external hard disk drive.

Leave the power cord of the computer plugged into the power source; the power cord grounds the computer and protects it from electrical damage. If the computer is plugged into a power strip, leave the power strip plugged into the power source and turned on during installation.

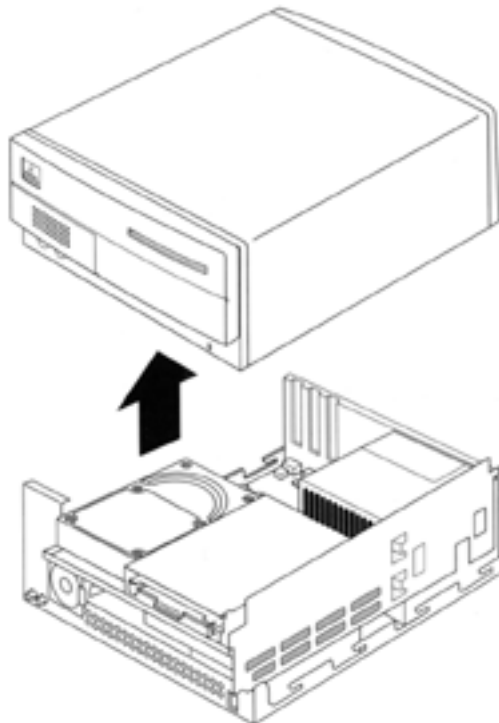


Access port cover

4. Use a screwdriver to loosen or remove the security screw.
5. Gently slide the cover about an inch from the back panel of the computer to disengage the locking tabs.



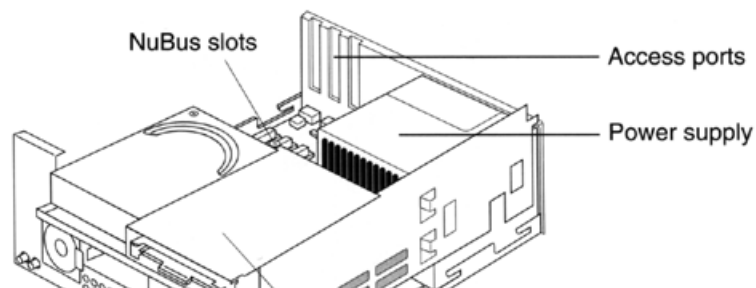
6. Lift the cover up and away from the computer.

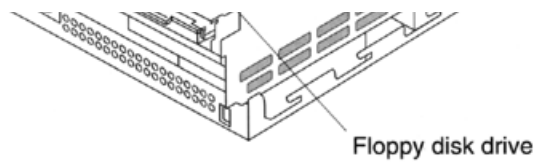


Installing the Interface Card

To install the interface card:

1. Locate an unoccupied NuBus expansion slot in the computer as shown in the following diagram. Remove the plastic access port cover and, if necessary, the corresponding metal access port shield. Keep the cover and shield in case you ever need to place them back in your Macintosh.





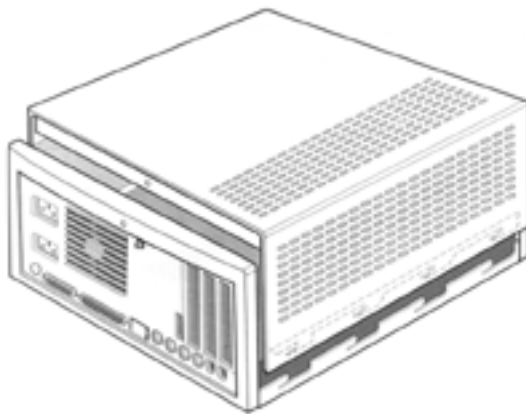
Touch the Macintosh power supply to discharge any accumulated static electricity. Even small amounts of static electricity can damage the interface card or your computer.

2. Remove the interface card from the anti static bag. Orient the card with the NuBus connector facing down and with the video port pointing toward the access port at the back of the computer.
3. Tilting the card slightly, guide the video port of the interface card into the access port of the computer.
4. Align the NuBus connector of the interface card with the NuBus expansion slot. Gently press down on the top edge of the interface card until you firmly seat the NuBus connector in the expansion slot. You should be able to see the video port of the interface card through the access port.

Do not force the interface card into place. If the card does not seat properly in the connector, gently lift the card, check for bent pins and try again.

Closing the Computer

1. Lower the cover onto the computer with the locking tabs of the inside rails aligned with the slots on the computer's frame. Refer to the following figure.



2. Gently slide the cover toward the back panel until the cover rests against the back frame.
3. Replace the security screw.

You have completed installation of the Radius Thunder interface card. Go to Chapter 2, "Getting Started."

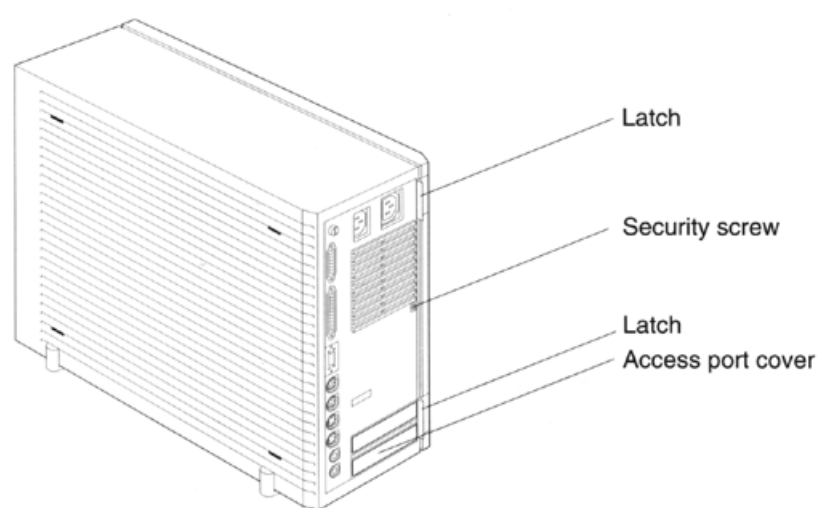
Installation for the Quadra 700/900/950

Use the following procedures to install the Radius Thunder interface card in a Macintosh Quadra 700, Quadra 900, or Quadra 950.

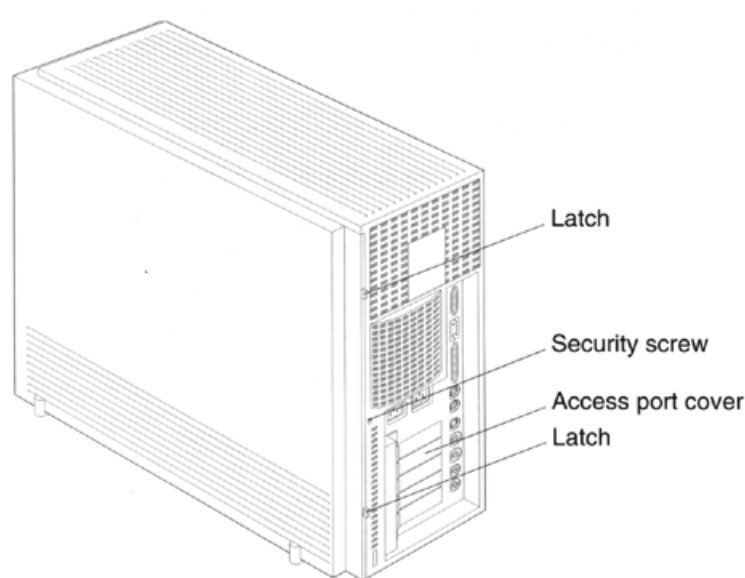
Opening the Quadra

Refer to the following figures while opening your computer.

This figure shows the back panel of a Quadra 700:



This figure shows the back panel of a Quadra 900 or Quadra 950:

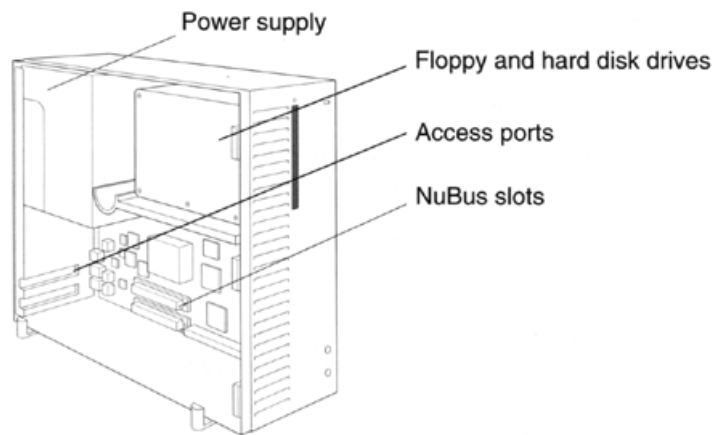


To open the Quadra:

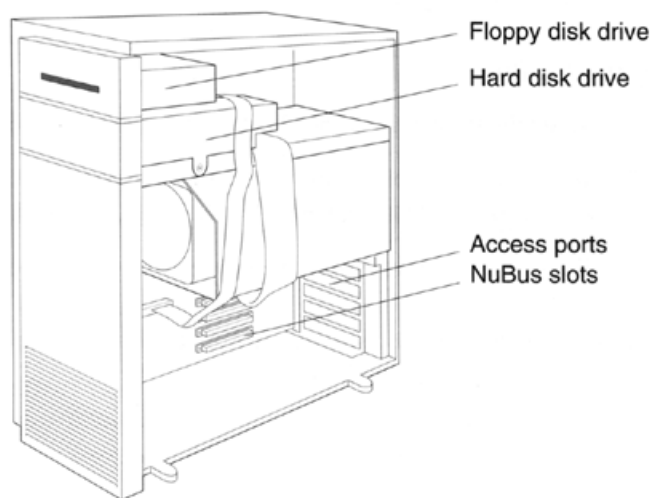
1. If necessary, remove any disk in the floppy disk drive.
2. Shut down the Quadra.
3. Turn off the power on all hardware components connected to the Quadra, including the display and external hard disk drive.
4. Unplug the power cord of the Quadra 900/950 from the power source. Leave the power cord plugged in if you have a Quadra 700.
5. Press the two latches on the back of the Quadra 900/950 to release the side panel. To release the panel on a Quadra 700, pull the two tabs.
6. Remove the side panel from the Quadra.

Installing the Interface Card

The following figure shows a Quadra 700:



This figure shows a Quadra 900/950:



To install the interface card in the Quadra:

1. Locate an unoccupied NuBus expansion slot and remove the access port cover corresponding to that slot.
2. Touch the metal part of the power supply case inside the Quadra to discharge any accumulated static electricity. Even small amounts of static electricity can damage the interface card and your Quadra.
3. Remove the interface card from the antistatic bag. Orient the card with the NuBus connector facing one of the NuBus expansion slots in the Quadra.
4. Tilt the card slightly and guide the video port of the interface card into the access port of the Quadra.

For the Quadra 900/950: Avoid dislodging the ribbon cables that connect the floppy disk drive and hard disk drive to the motherboard.

5. Align the NuBus connector of the interface card with the NuBus expansion slot. While holding the card perpendicular to the slot, gently press the card into the expansion slot until the NuBus connector is firmly seated. The video port of the interface card should be visible through the access port.

Do not force the interface card into place. If the card does not seat properly in the connector, gently lift the card, check for bent pins and try again.

Closing the Quadra

1. Align the front edge of the Quadra's side panel with the front edge of the case.
2. Be sure the edge of the interface card is aligned with the slots in the Quadra Expansion Card Guide, then close the cover. The latches will snap into place.
3. Replace the security screw, then plug in the Quadra 900/950.

You have now finished installing the Radius Thunder interface card. Go to Chapter 2, "Getting Started."

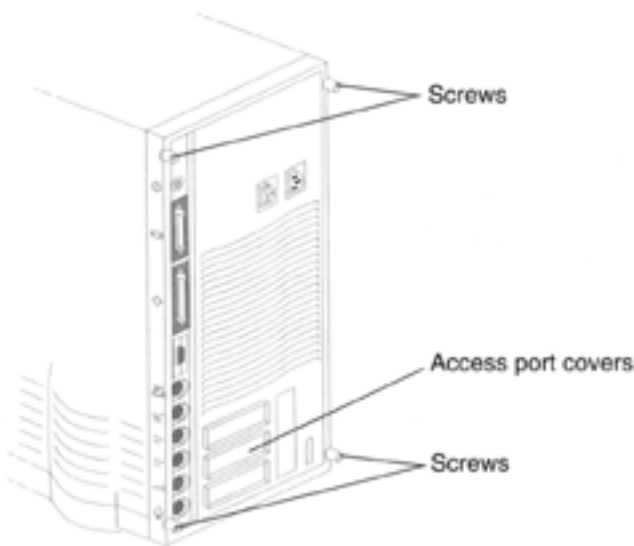
Installation for the Power Macintosh 8100 and Quadra 800/840AV

Use the following procedures to install the Radius Thunder interface card in a Power Macintosh 8100, a Quadra 800, or a Quadra 840AV.

Opening the Computer

To open the computer:

1. If necessary, remove any disk in the floppy disk drive.
2. Shut down the computer.
3. Loosen the four large screws at the corners of the back panel, but do not remove either the screws or the back panel.

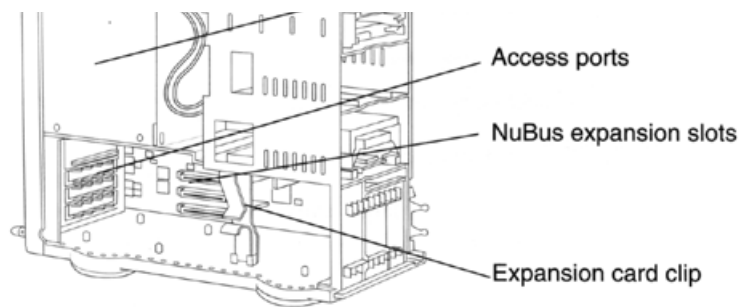


4. Remove the cover by sliding it away from the back panel an inch or two. Then raise the cover straight up and off the computer.

Installing the Interface Card

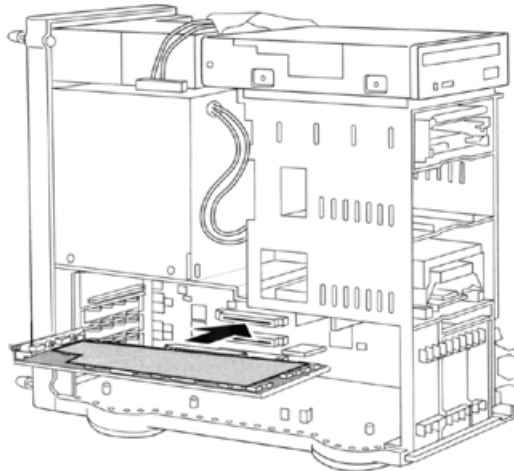
The following figure shows a side view of the computer.





To install the interface card:

1. Touch the metal part of the power supply inside the computer to discharge any static electricity that might be on your clothes or body.
2. Remove the Expansion Card Guide. Grasp the handles with your thumb and forefinger and squeeze, then pull the Guide straight out.
3. Pull off the access port cover behind the NuBus expansion slot you want to use.
4. Remove the interface card from its antistatic bag. Hold the card by its top edge to avoid touching the connector on the bottom of the card.
5. Align the connector and the card with the NuBus slot you want to use, as shown in the following diagram.



6. Press the card in firmly until the connector is seated. Do not force the card. If you meet a lot of resistance, pull the card out and try again. To see if the card is properly connected, wiggle it gently. If it resists and stays in place, it is connected correctly.
7. Replace the Expansion Card Guide by first replacing the bottom of the clip, then the top.

Closing the Computer

1. Lower the cover all the way down onto the case.
2. Push the cover back until it touches the back panel.
3. Tighten the screws on the back panel.

You have now finished installing the Radius Thunder interface card. Go to

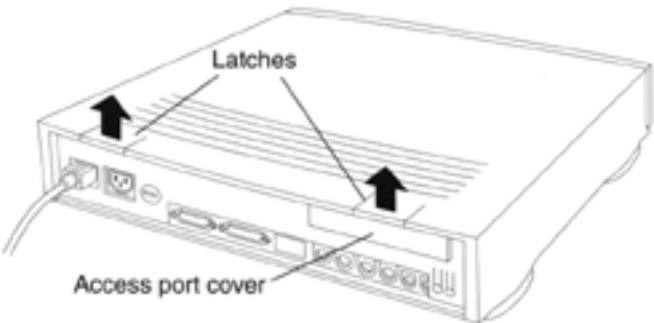
Installation for the Power Macintosh 6100, Centris 610/660AV, and Quadra 610/660AV

Note: You must have the appropriate NuBus adapter to install the interface card into a Power Macintosh 6100, Centris 610, Centris 660AV, Quadra 610, or Quadra 660AV. To purchase a NuBus adapter, contact your Apple reseller.

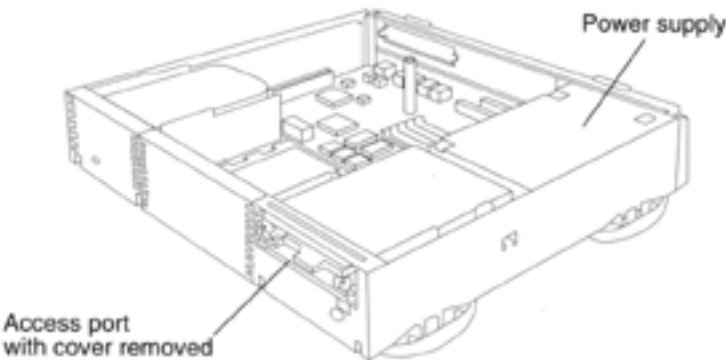
Opening the Computer

To open the computer:

1. If necessary, remove any floppy disks or CD-ROM disks from the internal drives.
2. Shut down the computer.
3. Pull up on the two latches on the back of the case. The latch positions are shown in the following illustration.



4. Tilt the back of the cover up, slide it toward the front panel, and lift it off.
5. Remove the access port cover from the access port. To do this, reach inside the computer and press the cover out.



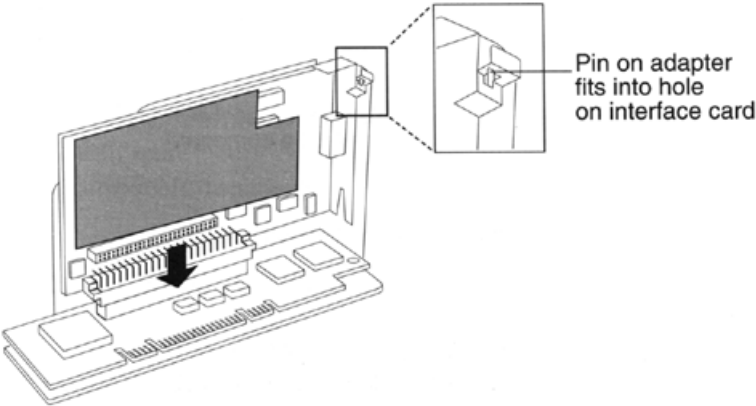
Installing the Interface Card

To install the interface card:

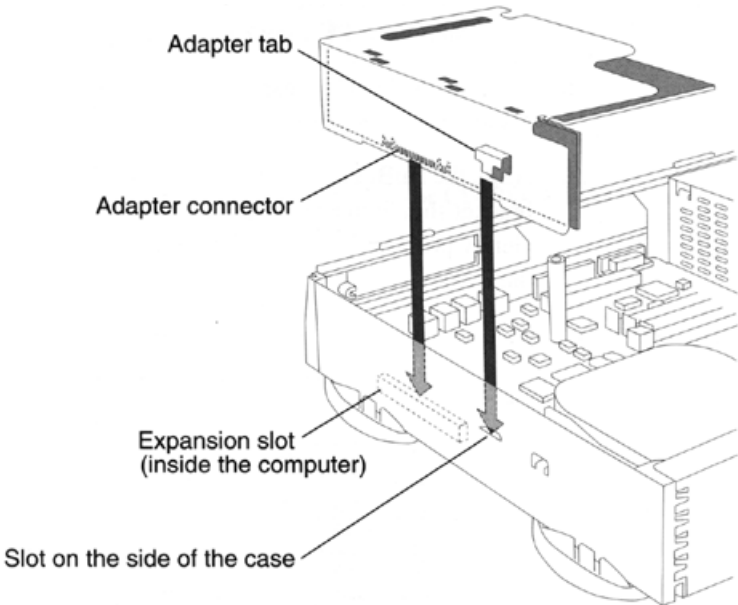
1. Touch the metal part of the power supply in the Macintosh to discharge any accumulated static electricity. Even small amounts of electricity can damage your interface card or your Macintosh.

2. Remove the interface card and NuBus adapter from their anti-static bags. Handle the cards only by their edges; do not touch the connectors or chips.

3. Align the NuBus connectors on the card and the adapter. The pin on the adapter bracket should line up with the hole on the metal end of the interface card. Gently press the NuBus connectors together until the card is securely seated in the adapter.



4. Insert the connector on the adapter into the expansion slot in the computer. Gently press the adapter card assembly down until the connector is fully seated. Make sure the tab on the side of the adapter card assembly slides into the slot on the side of the Macintosh case:



5. Insert the thumbscrews through the expansion slot into the two holes on the adapter. Hold the adapter against the access port as you tighten the thumbscrews.

Closing the Computer

1. Lower the front of the cover and slide it toward the back panel of the computer.

2. Align the ribs on the Macintosh case with the slots in the cover.

3. Press down on the latches to snap them into place.

You have now finished installing the Radius Thunder interface card. Go to Chapter 2, "Getting Started."

Chapter 2 - Getting Started

This chapter explains how to connect a Thunder interface card to your display and how to configure the interface to operate with your display. It also describes how to install the software included with your interface.

Thunder interface cards usually need to be configured only once. If you change your display move the interface to another slot, or clear the PRAM (**Parameter RAM**), you might need to reconfigure the interface card.

The Radius Thunder interface supports a wide variety of Macintosh and industry-standard video display modes. See Appendix B: Supported Displays on page 41 for a list of compatible displays and timings.

Placing and Connecting the Display

To connect the interface card to the display, you need a video cable with appropriate connectors for the interface card and the display. A compatible display cable is included with all Radius displays. If you need a cable for your display, contact your Radius Reseller.

Important: You must use a shielded video cable to comply with FCC requirements for radio-frequency emissions. All video cables shipped with Radius displays are properly shielded.

To set up your display:

1. Find an appropriate location for the display before you connect the AC power cord and the video cable.

WARNING: Never place a large-screen display directly on top of your computer. The weight of a large display can seriously damage a computer. Either place the display directly on your desk, or use a display stand. Contact your Radius Reseller if you need to purchase a display stand.

2. Plug the DB-15 connector on your display cable into the port on the Thunder interface card. Tighten the thumbscrews to secure the cable connector to the port.

3. Connect the other end of the display cable to your display and tighten the cable connectors. (Refer to the instructions supplied with the display, if necessary.)

4. Plug an AC power cord into the display and turn on the power.

Configuring the Interface Card

You must configure the interface card to send a compatible signal to your display. After you do this once, the card automatically uses the correct setting each time you start up the computer

If your display cable supports cable sense:

Your Thunder interface card automatically finds the correct setting at startup. Cable sense is a mechanism used by the interface card to identify the correct signaling to send to the display. Many display cables have the correct wiring configuration to support this feature.

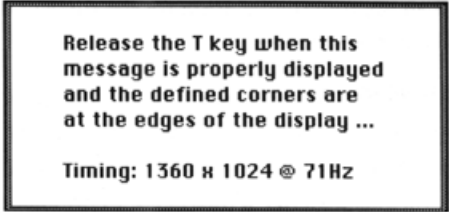
If your display is unreadable when you start your Macintosh, follow this procedure to configure your interface card:

1. Restart your Macintosh.

2. Immediately press the T key on your keyboard and continue to hold it down. (The T key toggles resolutions.)

√ The Thunder interface will try each of its display configurations in sequence. Each configuration will stay on the screen for approximately four seconds.

√ When a configuration is compatible with your display, the screen will be clear and readable, and you will see a message similar to this:



√ If you miss your compatible configuration setting, continue to hold down the T key; the Thunder interface will cycle through the configurations again.

3. When the screen is clear and readable, release the T key. The Macintosh restarts automatically and uses the selected resolution for your display.

Changing the Display Configuration

The display configuration information is stored in the Macintosh PRAM and will be used each time the Macintosh is restarted.

If you want to change the display configuration, use one of the following methods:

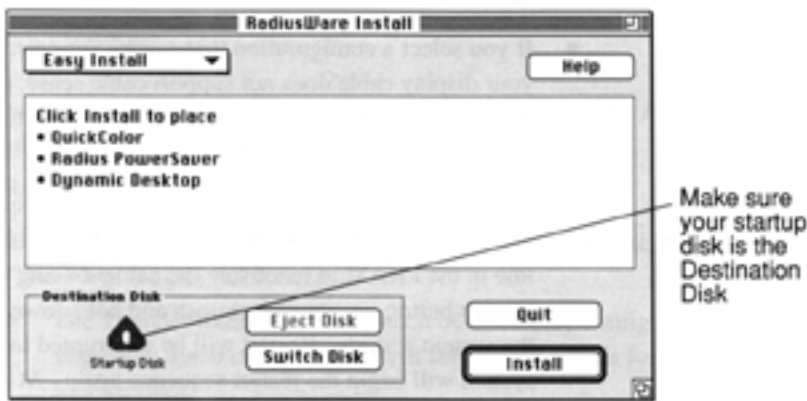
- Select a different display resolution using the Dynamic Desktop software.
- Select a different display resolution from the Monitors control panel. To do this, open the Monitors control panel and click the Options button. You can now choose a different display type and resolution. (Refer to the Radius Ware User's Manual for complete instructions.)
- If you select a configuration that causes your display to be unreadable, and your display cable does not support cable sense, press the Restart button on your computer. Hold down the T key during startup and release the T key when the appropriate screen configuration appears.
- If you select a configuration that causes your display to be unreadable, and your display cable supports cable sense, you can erase the monitor information line in the PRAM to reactivate the cable sensing feature. To do this, press the Restart button on your Macintosh and hold down the U key on the keyboard as the system restarts. Restart will be interrupted in about 30 seconds and the system will begin the restart sequence again. At that point, release the U key. Your display will be readable when the system is fully initialized.

Installing RadiusWare and PhotoEngine Software

Important: If you previously installed a Radius PhotoBooster card in your Macintosh, you must remove its associated software before you use PhotoEngine; PhotoBooster software is not compatible will PhotoEngine.

To install Radius Ware and PhotoEngine software:

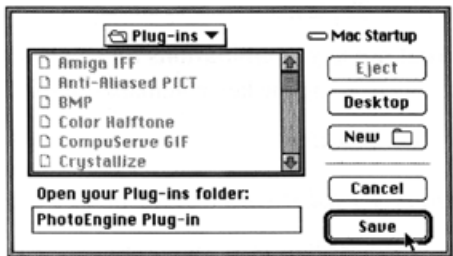
1. If you have anti-virus software installed on your computer, disable it before you begin the installation.
2. Insert the RadiusWare for Macintosh installation disk.
3. Double-click the ReadMe file to display information about updates, installation, tips, and other enhancements that may have been added after this manual was written.
4. When you finish reviewing the ReadMe file, choose Quit from the File menu.
5. Double-click the Installer icon. The Installer startup screen appears.
6. Click OK to continue. The Easy Install dialog box appears:



7. Make sure your startup disk is the destination disk, then click Install.

Note: To install the RadiusWare software on a hard disk drive other than the startup disk, click Switch Disk until the name of the drive appears in the Easy Install dialog box, then click Install. The Installer can update or install the RadiusWare software on any hard disk that contains a System Folder.

If you have a Thunder IV interface, a dialog box will prompt you to locate the Photoshop Plug-ins folder during the installation. The Plug-ins folder normally is located in the same folder as the Adobe Photoshop application. Use the dialog box to locate and open the Plug-ins folder, then click Save.



Important: If you chose a location other than the Photoshop Plug-ins folder for your plug-ins (using a Preferences command in the Adobe

Photoshop File menu), save the PhotoEngine plug-in to this new folder.

8. When installation is complete, you are prompted to restart your Macintosh. Click Restart.

9. Restore any virus-protection software that you disabled.

Your Thunder interface is now ready for use.

Using the RadiusWare Dynamic Desktop

The Dynamic Desktop, included with your RadiusWare software, lets you control the operation of your Thunder interface through simple “hot key” commands. Dynamic Desktop offers the following features:

- **Bit Depth/Resolution Changer** lets you change the resolution and number of colors or grays that appear on your display (bit depth), at any time, from within any application, by activating a simple pop-up menu.
- **Zoom** gives you a 200, 400, or 800% view of any portion of your screen, from within any application.
- **Panning** allows you to see the hidden portions of a zoomed or virtual desktop. In addition to the standard pan (where the screen image scrolls as the mouse pointer reaches the edge of the display), Dynamic Desktop offers two special pan modes.
- **Finder Cleanup** provides features that reorganize windows and icons when you change resolutions or rotate a Radius Pivot display.
- **Window Resize** expands or reduces the size of a window to fill the screen. Like Finder Cleanup, this feature is used when you change resolutions or rotate a Radius Pivot display.
- **Customized hot key combinations** for any Dynamic Desktop operation are available by changing the key commands in the Dynamic Desktop control panel.

Changing the Display Resolution or Number of Colors

If your display supports multiple resolutions, the Dynamic Desktop switches between these resolutions without restarting your system. If you do not have a display that can switch resolutions, you can still use the Dynamic Desktop to change the number of colors or grays on your display without opening the Monitors control panel.

To change the resolution or bit depth:

1. Hold down the Option and Control keys while you press the mouse button. A pop-tip menu appears at the pointer location.



2. Continue to hold down the mouse button and drag to select a display resolution. The number of choices that appear will depend on your particular

configuration.



3. Release the mouse button when you have made your selection. A check mark
() indicates the current selection.

After you change the display resolution, your screen image fades to black, then reappears using the new resolution. You do not have to restart your Macintosh.

Zooming In and Out

All Thunder interface cards can take advantage of the Dynamic Desktop Zoom feature.

To use the Zoom In and Zoom Out features:

1. Place your mouse pointer in the middle of the window or desktop area that you want to magnify.
2. Press the Option, Shift and I keys (or the hot keys you have chosen) simultaneously to zoom in. Each time you do, the image is magnified to a twice the previous view, beginning at 200, then 400, and then 800%.
3. To reverse the process press the Option, Shift and O keys. Each time you press the key combination, the image zooms out to the next lowest magnification level until it reaches the original desktop size.

When you are at any of the zoom in or out levels of 200, 400 or 800%, your system automatically shifts into the standard pan mode. This pan mode allows you to view previously hidden portions of the desktop when the mouse pointer reaches the edge of your screen image. RadiusWare also offers two other types of pan modes.

To change the hot key settings for Zoom In or Zoom Out, and for complete information about the other features of RadiusWare, refer to the RadiusWare User's Manual included with this product.

The following chapter describes how to use PhotoEngine to accelerate Adobe Photoshop operations.

Chapter 3 - Using PhotoEngine Acceleration

If you have a Thunder IV interface, your interface includes PhotoEngine hardware and software. PhotoEngine software directs the processing of key Adobe Photoshop operations to four DSP (**D**ual **S**ignal **P**rocessing) chips on the Thunder IV daughter card. The DSP chips process the Adobe Photoshop commands much faster than the Macintosh CPU alone, so performance is accelerated.

Note: If you have a Thunder/24 GT interface, you can add PhotoEngine capabilities by purchasing a Thunder/24 GT Upgrade from your Radius Reseller.

PhotoEngine software consists of a PhotoEngine Plug-in (which you place in the same folder as your other Adobe Photoshop plug-ins during installation), and the Radius DSP system extension (which is installed automatically into the Extensions folder within your System Folder). The PhotoEngine software requires Adobe Photoshop version 2.5.1 or later.

This chapter explains how to install and use the PhotoEngine software.

PhotoEngine Features

PhotoEngine takes advantage of Adobe's extension architecture to speed up many of the menu commands and routines in Adobe Photoshop. PhotoEngine is certified as Adobe Charged, which means the results achieved with PhotoEngine are visually identical to those obtained using Adobe Photoshop without acceleration.

The speed increases that you can expect depend on the complexity of the operations you are performing. For example, a Gaussian Blur requires more calculations per pixel than a simple Blur. Because each calculation in the process is accelerated, the performance of an accelerated Gaussian Blur is dramatically faster than that of an unaccelerated Gaussian Blur. An accelerated simple Blur is noticeably faster than one that is unaccelerated, but the difference is not as striking.

PhotoEngine software accelerates the following Adobe Photoshop operations:

File Menu

- Preview creation during Save operations (enabled in General Preferences)

Mode Menu

- RGB Color to Lab Color
- RGB Color to CMYK Color
- Lab Color to CMYK Color

PhotoEngine also accelerates screen redraws as you work in CMYK Smoother mode. (Smoother mode for CMYK is enabled in General Preferences, available from the File menu.)

Image Menu

The following Image menu commands are accelerated by PhotoEngine for the Bicubic and Bilinear interpolation methods.

- Arbitrary Rotate
- Skew
- Scale
- Free Rotate
- Perspective
- Image Size

The interpolation method used by Adobe Photoshop is set in the General Preferences dialog box. The greatest increase in processing speed (compared to an unaccelerated Macintosh) occurs when Bicubic interpolation is enabled, since Bicubic interpolation requires more calculations than Bilinear interpolation.

Filter Menu

- Blur
- Sharpen More
- Blur More
- Gaussian Blur
- Despeckle
- Sharpen
- Sharpen Edges
- Sharpen More
- Unsharp Mask
- Find Edges
- Custom
- High Pass
- Motion Blur (for Bicubic and Bilinear interpolation settings)
- Emboss, with the following restrictions:
 Heights up to 4: accelerated for any available angle
 Heights up to 5: 25° to 64°, 116° to 154°, -25° to -64°, -116° to -154°
 Heights up to 6: 42° to 48°, 132° to 138°, -42° to -48°, -132° to -138°
 Heights greater than 6 are not accelerated by PhotoEngine

Select Menu

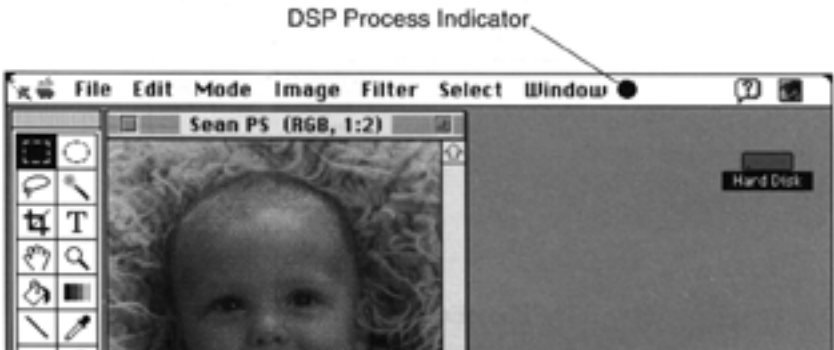
- Feather

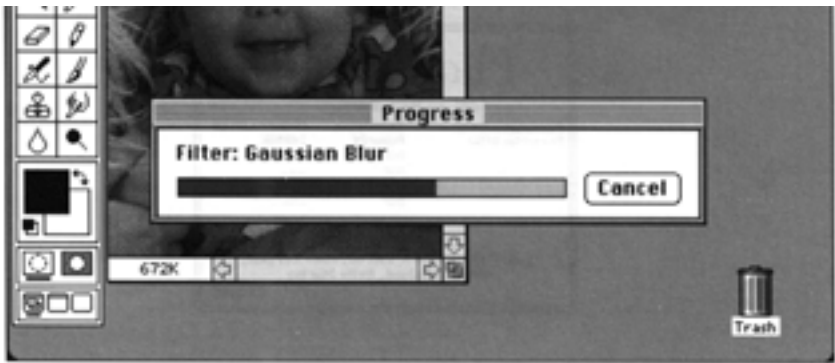
Using PhotoEngine

To use PhotoEngine, simply select commands from the standard Adobe Photoshop menus; acceleration of supported operations is enabled automatically. To monitor PhotoEngine activity, you can enable the PhotoEngine DSP Process Indicator.

Using the DSP Process Indicator

The DSP Process Indicator appears as a green dot in the Adobe Photoshop menu bar when PhotoEngine is processing an accelerated Adobe Photoshop function. Processing speed is not affected by the presence of the indicator.





DSP Process Indicator in a Desktop window

To enable the DSP Process Indicator:

- 1. Double-click the Adobe Photoshop icon to start the application.
- 2. Choose About Plug-in from the Apple () menu, and drag to the right to select PhotoEngine:



The PhotoEngine About box appears:



- 3. Hold down the Option key and click anywhere in the Configuration About box. This activates the DSP Process Indicator, and closes the box.

To deactivate the DSP Process Indicator, repeat this procedure.

Considerations and Tips

For optimum performance, make sure you have allocated as much memory as possible to Adobe Photoshop. Adobe recommends that you allocate to the application at least three times as much memory as your largest image size, plus 1 MB. This ensures that image manipulation takes place entirely in memory. When insufficient memory is allocated to the Adobe Photoshop application, the application must use temporary storage on the hard disk to

complete a command, increasing the overall processing time.

The Adobe Photoshop Configuration About box lists information such as the amount of memory allocated to Adobe Photoshop and the processors that will be used for acceleration. To display this box, hold down the Option key while you start the application, or choose About Photoshop from the Apple () menu while the application is active.

Chapter 4 - Troubleshooting

This chapter contains troubleshooting tips for your Thunder interface card, and for PhotoEngine.

Troubleshooting Your Display System

Should you experience a problem with your system, first take a few minutes to try to isolate the difficulty. Performing a few basic steps will verify whether there is, in fact, a problem.

If there is no screen image:

- ✓ Check to see if the power to the display has been interrupted.
- ✓ Make sure the interface cable is firmly connected to the Thunder interface and to the port on the back of the display.

If you still are not getting an image or if you have a problem of a different nature that you think is related to the display, contact the reseller or dealer from which you purchased the display. If you have a problem that you think is related to a Radius display, or to the Thunder interface, contact your Radius Authorized Reseller for assistance.

If the screen image is distorted, unreadable or blank:

1. Restart your Macintosh.
2. Immediately hold down the T key on the keyboard.
3. When the screen image is clear and readable, immediately release the T key. The Macintosh will restart, and the Thunder interface will use the correct mode to operate the display.

Note: If your screen image was readable when you first started your Macintosh after installing the Thunder interface, but you later chose an incompatible resolution, press the Restart button on your computer then hold down the U key as the system restarts. This erases the monitor information line in the PRAM and reactivates Thunder's cable sense feature. Continue to hold down the U key. After about 30 seconds, the restart sequence will be interrupted, and the system will begin a new restart routine. When this happens, release the U key. Your display will be readable when the system is fully initialized.

If your display cable has cable sense, and screen image is readable, but is shifted too far to the right or left after the system restarts:

- ✓ Install RadiusWare, then select a new display type and resolution from list in the Options dialog box available from the Monitors control panel. If your display does not appear in the list, select the Apple display type and monitor setting for your screen size. For example, if you have a 21" display, select an Apple 21" display type and monitor setting from the Monitors control panel Options that appear (See the RadiusWare User's Manual for details.)

- O R -

√ Hold down the T key as you restart your system. Your Thunder interface will start its configuration sequence. Release the T key when the proper setting appears. (See "Configuring the Interface Card" on page 22 for more detailed instructions.)

Troubleshooting PhotoEngine

If the icon for the •Radius DSP system extension appears with an X through it when your Macintosh starts up, make sure:

√ The daughter card is securely connected to the base board of the Thunder card set.

√ The Thunder card is properly installed in the NuBus slot of your Macintosh.

√ That 32-bit Addressing is activated in the Memory control panel.

√ That Virtual Memory is turned off in the Memory control panel.

√ That you have removed other hardware and/or software from any other Adobe-Charged product, such as the Radius PhotoBooster or a SuperMac ThunderStorm™ or Image-Processing Accelerator card and software.

If the Adobe Photoshop functions that PhotoEngine supports do not appear to be running faster make sure:

√ The daughter card is securely connected to the base board of the Thunder card set.

√ The Thunder card is properly installed in the NuBus slot of your Macintosh.

√ The Radius DSP system extension has been placed in the Extensions folder in the System Folder of your Macintosh computer's startup disk.

√ The PhotoEngine Plug-in has been placed in the folder you have designated as your Photoshop Plug-ins folder. (You choose the Plug-ins folder using the Preferences File menu command. If you change this preference, you must restart the Adobe Photoshop application.) When installed correctly, PhotoEngine appears under the About Plug-in sub-menu, in the Apple menu.

√ You are using Adobe Photoshop version 2.5.1 or later. If necessary, contact Adobe or your Adobe reseller for the most recent version of Adobe Photoshop.

√ If you have more than one copy of Adobe Photoshop on your hard disk, make sure that the version you currently are running is at least 2.5.1. Launching Adobe Photoshop by double-clicking an Adobe Photoshop document will not always start the latest version of the application.

√ You have allocated as much memory as possible to Adobe Photoshop. Adobe Photoshop runs fastest when the memory assigned to it is 3 to 5 times the size of the largest image file you will be processing. (Adobe recommends at least 3 times the size of your image file, plus 1 MB.) By allocating sufficient memory to Adobe Photoshop, you ensure that overall processing time is not

increased due to frequent hard disk access.

Appendix A - Thunder Interface Specifications

General Specifications

	Thunder IV GX•1600	Thunder IV GX•1360	Thunder IV GX•1152	Thunder/24 GT
Radius Product	0513	0446	0485	0491
Interface Type	NuBus 90 block transfer- compatible	NuBus 90 block transfer- compatible	NuBus 90 block transfer- compatible	NuBus 90 block transfer- compatible
Interface Size	7.9 x 4 inches	7.9 x 4 inches	7.9 x 4 inches	7.9 x 4 inches
VRAM Size	6 MB	6 MB	3 MB	3 MB
Maximum Pixel Clock	185 MHz	185 MHz	185 MHz	185 MHz
Maximum Resolution	1600 x 1200	1360 x 1024 (1600 x 1200 at 256 colors)	1152 x 870 (1600 x 1200 at 256 colors)	1152 x 870 (1600 x 1200 at 256 colors)
Maximum Bit Depth	24 bits	24 bits	24 bits	24 bits
Maximum Colors	16.7 million	16.7 million	16.7 million	16.7 million
Video-Output Format	RS-343A	RS-343A	RS-343A	RS-343A
Bit Depths Supported	1, 4, 8, 16, and 24	1, 4, 8, 16, and 24	1, 4, 8, 16, and 24	1, 4, 8, 16, and 24

NuBus Power Requirements

The maximum current and power used are:

	Bus Voltage	Current	Power
Thunder IV GX•1600	+ 5V bus	5.3 amperes	26.5 watts
	+12V bus	0.05 amperes	0.6 watts
	-12V bus	0.01 amperes	0.12 watts
Thunder IV GX•1360	+ 5V bus	4.9 amperes	24.5 watts
	+12V bus	0.05 amperes	0.6 watts
	-12V bus	0.01 amperes	0.12 watts
Thunder IV GX•11152	+ 5V bus	4.2 amperes	21.0 watts
	+12V bus	0.05 amperes	0.6 watts
	-12V bus	0.01 amperes	0.12 watts
Thunder /24 GT	+ 5V bus	2.2 amperes	11.0 watts
	+12V bus	0.05 amperes	0.6 watts
	-12V bus	0.01 amperes	0.12 watts

Appendix B - Supported Displays

This appendix lists monitor settings for many popular displays supported by Radius Thunder interface cards.

If your display is not listed in this appendix, it may still be supported. Check the specifications in the user's manual included with your display to find the screen refresh rate (in Hz) and the resolutions supported by the display. Then compare these specifications to those given in the table for your interface card. If you find a matching resolution at the correct refresh rate, your display is supported.

The following symbols are used in the tables of supported displays:

- † At this selling, a maximum of 256 colors/grays (for color displays) or 256 grays (for monochrome displays) are supported.
- †¹³⁶⁰ †1360) At this setting, Thunder IV GX•1360 can display a maximum of 256 colors/grays on color displays or 256 grays on monochrome displays, and Thunder IV GX•1600 can display millions of colors on color displays or 256 grays on color or monochrome displays.
- * (*) Indicates the default setting for the display

Virtual desktops are listed by their horizontal dimensions and the dimension of the portion of the desktop that is visible without panning. For example a desktop listed as Virtual t600 @ 1152 x 870, means the entire desktop is 1600 x 1200 pixels, with 1152 x 870 pixels visible at once.

Thunder IV 1152 and Thunder/24 GT Settings

Display Type	Monitor Settings Supported
Apple 13" Color	640 x 480 (67 Hz)*
Apple 15" Monochrome Portrait	640 x 870 (75 Hz)*
Apple 15" Color Portrait	640 x 870 (75 Hz)*
Apple 16" Color	832 x 624 (75 Hz)*
Apple 19" Color	1024 x 768 (75 Hz)*, Virtual 1600 @ 1024 x 768†
Apple 21" Monochrome	1152 x 870 (75 Hz)*, Virtual 1600 @ 1152 x 870†
Apple 21" Color	1152 x 870 (75 Hz)*, Virtual 1600 @ 1152 x 870†
Apple 13" Multi-frequency	640 x 480 (67 Hz)*, 832 x 624 (75 Hz)
Apple 17" Multi-frequency	640 x 480 (67 Hz), 832 x 624 (75 Hz)*, 1024 x 768 (75 Hz), Virtual 1600 @ 1024 x 768†
Apple 21" Multi-frequency	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1152 x 870†
Apple VGA/SVGA	640 x 480 (67 Hz)*, 800 x 600 (60 Hz), 1024 x 768 (60 Hz), Virtual 1600 @ 1024 x 768†
Radius FPD, FPD/gs, Pivot, Pivot/gs	640 x 870 (75 Hz)*
Radius Color Pivot (Apple Mode)	640 x 870 (75 Hz)*
Radius Color Pivot (Radius Mode)	640 x 870 (75 Hz)*

Radius Color Pivot/LE	832 x 624 (72 Hz)*
Radius PrecisionColor Pivot	640 x 480 (67 Hz), 832 x 624 (75 Hz)*, 1024 x 768 (75 Hz), Virtual 1600 @ 1024 x 768†
Radius Mono TPD/20gs or TPD/21gs	1152 x 870 (75 Hz), Virtual 1600 @ 1152 x 870†
Radius Mono TPD/19 or TPD/21	1152 x 870 (71 Hz), Virtual 1600 @ 1152 x 870†
Radius Color TPD/19	1152 x 870 (71 Hz), Virtual 1600 @ 1152 x 870†
Radius Color TPD/21	1056 x 870 (77 Hz), 1152 x 870 (71 Hz), Virtual 1600 @ 1152 x 870†
Radius Color Display/21	1152 x 870 (75 Hz), Virtual 1600 @ 1152 x 870†
Radius PrecisionColor Display/17	640 x 480 (67 Hz), 832 x 624 (75 Hz)*, 1024 x 768 (75 Hz), 1152 x 870 (75 Hz), Virtual 1600 @ 1152 x 870†

Display Type	Monitor Settings Supported
Radius PrecisionColor Display/19	640 x 480 (67 Hz)*, 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz), Virtual 1600 @ 1152 x 870†
Radius PrecisionColor Display/20v	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz)*, 1152 x 870 (75 Hz), Virtual 1600 @ 1152 x 870†
Radius PrecisionColor Display/20	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1152 x 870†
Radius IntelliColor Display/20	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1360 x 1024†
Radius IntelliColor Display/20e	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1360 x 1024†
Radius PrecisionColor Display/21	1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1360 x 1024†
SuperMac 16"/17" Multi-Mode	640 x 480 (67 Hz), 832 x 624 (75 Hz)*, 1024 x 768 (75 Hz), Virtual 1600 @ 1024 x 768†
SuperMatch 17•T XL	640 x 480 (67 Hz), 832 x 624 (75 Hz)*, 1024 x 768 (75 Hz), Virtual 1600 @ 1024 x 768†
SuperMac 20" Dual-Mode	1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1152 x 870†
SuperMac 20" Multi-Mode	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1152 x 870†
SuperMatch High-Res 20	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1360 x 1024†
SuperMatch PressView 21	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1360 x 1024†
SuperMatch 21•T XL	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1360 x 1024†
NEC 3V/3FGe/3FGx	640 x 480 (67 Hz)*, 832 x 624 (74 Hz), 1024 x 768 (70 Hz), Virtual 1600 @ 1024 x 768†
NEC 4FG	640 x 480 (67 Hz)*, 832 x 624 (74 Hz), 1024 x 768 (70 Hz), Virtual 1600 @ 1024 x 768†

Display Type	Monitor Settings Supported
NEC 4FGe/5FGe	640 x 480 (67 Hz)*, 832 x 624 (74 Hz), 1024 x 768 (75 Hz), Virtual 1600 @ 1024 x 768†
NEC 5FG/5FGp	640 x 480 (67 Hz)*, 832 x 624 (74 Hz), 1024 x 768 (75 Hz), 1152 x 870 (73 Hz), Virtual 1600 @ 1152 x 870†
NEC 6FG/6FGp	640 x 480 (67 Hz)*, 832 x 624 (74 Hz), 1024 x 768 (75 Hz), 1152 x 870 (73 Hz), Virtual 1600 @ 1152 x 870†
Other Multi-Frequency Displays	640 x 480 (67 Hz), 832 x 624 (74 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz) 640 x 480 (60 Hz), 1024 x 768 (60 Hz), 1024 x 768 (75 Hz), 1152 x 870 (71 Hz) 1024 x 768 (75 Hz), 1152 x 870 (71 Hz)

Thunder IV GX•1360 and Thunder IV GX•1600 Settings

Display Type	Monitor Settings Supported
Apple 13" Color	640 x 480 (67 Hz)*
Apple 15" Monochrome Portrait	640 x 870 (75 Hz)*
Apple 15" Color Portrait	640 x 870 (75 Hz)*
Apple 16" Color	832 x 624 (75 Hz)*
Apple 19" Color	1024 x 768 (75 Hz)*, Virtual 1600 @ 1024 x 768, Virtual 2000 @ 1024 x 768†
Apple 21" Monochrome	1152 x 870 (75 Hz)*, Virtual 1600 @ 1152 x 870, Virtual 2000 @ 1152 x 870†
Apple 21" Color	1152 x 870 (75 Hz)*, Virtual 1600 @ 1152 x 870, Virtual 2000 @ 1152 x 870†
Apple 13" Multi-frequency	640 x 480 (67 Hz)*, 832 x 624 (75 Hz)
Apple 17" Multi-frequency	640 x 480 (67 Hz), 832 x 624 (75 Hz)*, 1024 x 768 (75 Hz), Virtual 1600 @ 1024 x 768, Virtual 2000 @ 1024 x 768†
Apple 21" Multi-frequency	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1024 x 768 and 1152 x 870, Virtual 2000 @ 1152 x 870†
Apple VGA/SVGA	640 x 480 (60 Hz)*, 800 x 600 (60 Hz), 1024 x 768 (60 Hz), Virtual 1600 @ 1024 x 768, Virtual 2000 @ 1024 x 768†
Radius FPD, FPD/gs, Pivot, Pivot/gs	640 x 870 (75 Hz)*
Radius Color Pivot (Apple Mode)	640 x 870 (75 Hz)*
Radius Color Pivot (Radius Mode)	640 x 870 (75 Hz)*
Radius Color Pivot/LE	832 x 624 (72 Hz)*
Radius PrecisionColor Pivot	640 x 480 (67 Hz), 832 x 624 (75 Hz)*, 1024 x 768 (75 Hz), Virtual 1600 @ 1024 x 768, Virtual 2000 @ 1024 x 768†
Radius Mono TPD/20gs or TPD/21gs	1152 x 870 (75 Hz), Virtual 1600 @ 1152 x 870, Virtual 2000 @ 1152 x 870†
Radius Mono TPD/19 or TPD/21	1152 x 870 (71 Hz), Virtual 1600 @ 1152 x 870, Virtual 2000 @ 1152 x 870†

Display Type	Monitor Settings Supported
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Display Type	Monitor Settings Supported
Radius Color TPD/19	1152 x 870 (71 Hz), Virtual 1600 @ 1152 x 870, Virtual 2000 @ 1152 x 870†
Radius Color TPD/21	1056 x 870 (77 Hz), 1152 x 870 (71 Hz), Virtual 1600 @ 1152 x 870, Virtual 2000 @ 1152 x 870†
Radius Color Display/21	1152 x 870 (75 Hz), Virtual 1600 @ 1152 x 870, Virtual 2000 @ 1152 x 870†
Radius PrecisionColor Display/17	640 x 480 (67 Hz), 832 x 624 (75 Hz)*, 1024 x 768 (75 Hz), 1152 x 870 (75 Hz), 1600 x 1200 (63 Hz)† ¹³⁶⁰ , Virtual 1600 @ 1024 x 768 and 1152 x 870, Virtual 2000 @ 1600 x 1200†
Radius PrecisionColor Display/19	640 x 480 (67 Hz)*, 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz), Virtual 1600 @ 1024 x 768 and 1152 x 870, Virtual 2000 @ 1152 x 870†
Radius PrecisionColor Display/20v	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz)*, 1152 x 870 (75 Hz), Virtual 1600 @ 1024 x 768 and 1152 x 870, Virtual 2000 @ 1152 x 870†
Radius PrecisionColor Display/20	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1024 x 768 and 1152 x 870, Virtual 2000 @ 1152 x 870†
Radius IntelliColor Display/20	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, 1280 x 1024 (74 Hz), 1360 x 1024 (75 Hz), 1600 x 1200 (63 Hz)† ¹³⁶⁰ , Virtual 1600 @ 1024 x 768, 1152 x 870, and 1360 x 1024, Virtual 1984 @ 1360 x 1024, Virtual 2000 @ 1600 x 1200†
Radius IntelliColor Display/20e	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, 1280 x 1024 (74 Hz), 1360 x 1024 (75 Hz), 1600 x 1200 (63 Hz)† ¹³⁶⁰ , Virtual 1600 @ 1024 x 768, 1152 x 870, and 1360 x 1024, Virtual 1984 @ 1360 x 1024, Virtual 2000 @ 1600 x 1200†

Display Type	Monitor Settings Supported
Radius PrecisionColor Display/21	1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, 1280 x 1024 (74 Hz), 1360 x 1024 (71 Hz), 1600 x 1200 (63 Hz)† ¹³⁶⁰ , Virtual 1600 @ 1024 x 768, 1152 x 870, and 1360 x 1024, Virtual 1984 @ 1360 x 1024, Virtual 2000 @ 1600 x 1200†
SuperMac 16"/17" Multi-Mode	640 x 480 (67 Hz), 832 x 624 (75 Hz)*, 1024 x 768 (75 Hz), Virtual 1600 @ 1024 x 768, Virtual 2000 @ 1024 x 768†
SuperMatch 17" T XL	640 x 480 (67 Hz), 832 x 624 (75 Hz)*, 1024 x 768 (75 Hz), Virtual 1600 @ 1024 x 768, Virtual 2000 @ 1024 x 768†
SuperMac 20" Dual-Mode	1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1024 x 768 and 1152 x 870, Virtual 2000 @ 1152 x 870†
SuperMac 20" Multi-Mode	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, Virtual 1600 @ 1024 x 768 and 1152 x 870, Virtual 2000 @ 1152 x 870†
SuperMatch High-Res 20	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, 1280 x 1024 (74 Hz), 1360 x 1024 (71 Hz), Virtual 1600 @ 1024 x 768, 1152 x 870, and 1360 x 1024, Virtual 1984 @ 1360 x 1024, Virtual 2000 @ 1600 x 1200†

	Virtual 2000 @ 1600 x 1200†
SuperMatch PressView 21	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, 1280 x 1024 (74 Hz), 1360 x 1024 (71 Hz), 1600 x 1200 (69 Hz)† ¹³⁶⁰ , Virtual 1600 @ 1024 x 768, 1152 x 870, and 1360 x 1024, Virtual 1984 @ 1360 x 1024, Virtual 2000 @ 1600 x 1200†
SuperMatch 21•T XL	640 x 480 (67 Hz), 832 x 624 (75 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz)*, 1280 x 1024 (74 Hz), 1360 x 1024 (71 Hz), 1600 x 1200 (69 Hz)† ¹³⁶⁰ , Virtual 1600 @ 1024 x 768, 1152 x 870, and 1360 x 1024, Virtual 1984 @ 1360 x 1024, Virtual 2000 @ 1600 x 1200†
NEC 3V/3FGe/3FGx	640 x 480 (67 Hz)*, 832 x 624 (74 Hz), 1024 x 768 (60 Hz), Virtual 1600 @ 1024 x 768, Virtual 2000 @ 1024 x 768†

Display Type	Monitor Settings Supported
NEC 4FG	640 x 480 (67 Hz)*, 832 x 624 (74 Hz), 1024 x 768 (70 Hz), Virtual 1600 @ 1024 x 768, Virtual 2000 @ 1024 x 768†
NEC 4FGe/5FGe	640 x 480 (67 Hz)*, 832 x 624 (74 Hz), 1024 x 768 (75 Hz), Virtual 1600 @ 1024 x 768, Virtual 2000 @ 1024 x 768†
NEC 5FG/5FGp	640 x 480 (67 Hz)*, 832 x 624 (74 Hz), 1024 x 768 (75 Hz), 1152 x 870 (73 Hz), Virtual 1600 @ 1024 x 768 and 1152 x 870, Virtual 2000 @ 1024 x 768†
NEC 6FG/6FGp	640 x 480 (67 Hz)*, 832 x 624 (74 Hz), 1024 x 768 (75 Hz), 1152 x 870 (73 Hz), Virtual 1600 @ 1024 x 768 and 1152 x 870, Virtual 2000 @ 1024 x 768†
NEC LCD1280	1280 x 1024 (60 Hz)*
Other Multi-Frequency Displays	640 x 480 (67 Hz), 832 x 624 (74 Hz), 1024 x 768 (75 Hz), 1152 x 870 (75 Hz) 1280 x 1024 (60 Hz) 640 x 480 (60 Hz), 1024 x 768 (60 Hz), 1024 x 768 (75 Hz), 1152 x 870 (71 Hz) 1024 x 768 (75 Hz), 1152 x 870 (71 Hz)

Display Notes

√ Many multi-frequency displays can be configured to either 640 x 480 or 800 x 600 - and possibly other modes as well. Use the T key at startup to find the modes that are compatible with your particular display, and then select any compatible mode. You can change to a different compatible resolution at any time by using the Dynamic Desktop Bit Depth/Resolution Changer.

WARNING: It is possible to select a resolution that is incompatible with your display. Refer to the user's manual for your display for information about compatible resolutions. If you select an incompatible resolution, your screen will become unreadable. If this happens, refer to Chapter 2 for instructions on how to reset the resolution.

√ The Radius PrecisionColor Pivot will function in Landscape Only mode in

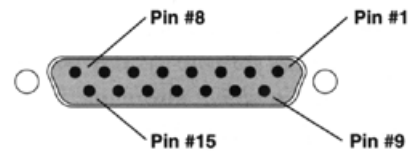
resolutions up to 1024 x 768 when connected to the Thunder interface card.

√ The only display setting supported by Thunder interface cards for the original Color Pivot Displays (0277 & 0233) is Portrait Only 640 x 870 resolution. The switch on the back of the display must be set to the Radius position.

√ The only display setting supported by Thunder interface cards for the Radius Pivots (0276 & 0361) is Portrait Only 640 x 870 resolution.

Appendix C: Video Port Specifications

The following table lists the video port pin-out specifications for the DB-15 connector on your Thunder interface card.



Pin numbers for the Thunder video port

<u>Pin</u>	<u>Output signal</u>
1	Red Ground
2	Red Signal
3	CSync
4	ID 1
5	Green Signal
6	Green Ground
7	ID 2
8	no connection
9	Blue Signal
10	ID3
11	Digital Ground
12	VSync
13	Blue Ground
14	Digital Ground
15	HSync
Chassis	Ground

WARNING: To comply with FCC regulations, a shielded interface cable must be used with all Thunder interface cards.

Appendix D: Regulatory Approvals

FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. If this equipment does cause harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user must correct the interference. It is recommended that you first try one or more of the following measures:

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.
- In case of TV or radio interference, turn the antenna until the interference stops, or consider installing an antenna with coaxial cable lead-in between the antenna and the TV.
- Increase the separation between the equipment and receiver
- Reorient or relocate the receiving antenna

Important: Modifications or changes to this product that are not expressly approved by Radius could void the user's authority to operate the equipment.

To ensure compliance to FCC non-interference regulations, peripherals attached to this computer require shielded I/O cables.

You may find the following booklet prepared by the Federal Communications Commission helpful:

How to Identify and Resolve Radio-TV Interference Problems

Stock # 004-000-00345-4

The above booklet is available from:

U.S. Government Printing Office

Washington, DC 20402

(202) 783-3238

Industry Canada Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of Industry Canada (formerly DOC).

El présent appareil numérique n'émet pas de bruit radioélectrique dépassant les limites applicables aux appareils numériques de Classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère d'Industrie Canada (DOC).

Japanese VCCI Statement

This equipment is in the 1St Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Information-Technology Equipment aimed at preventing radio interference in commercial and/or industrial areas.

Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc. Read the instructions for correct handling.